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Fuse

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(54) **WATER JET PROPELLER**

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(51) **Int. Cl.**[7] **B63H 11/00**
(52) **U.S. Cl.** ..... **440/38**; 440/88 M
(58) **Field of Search** ..... 440/38, 39, 88 M, 440/40, 41, 42, 43, 46

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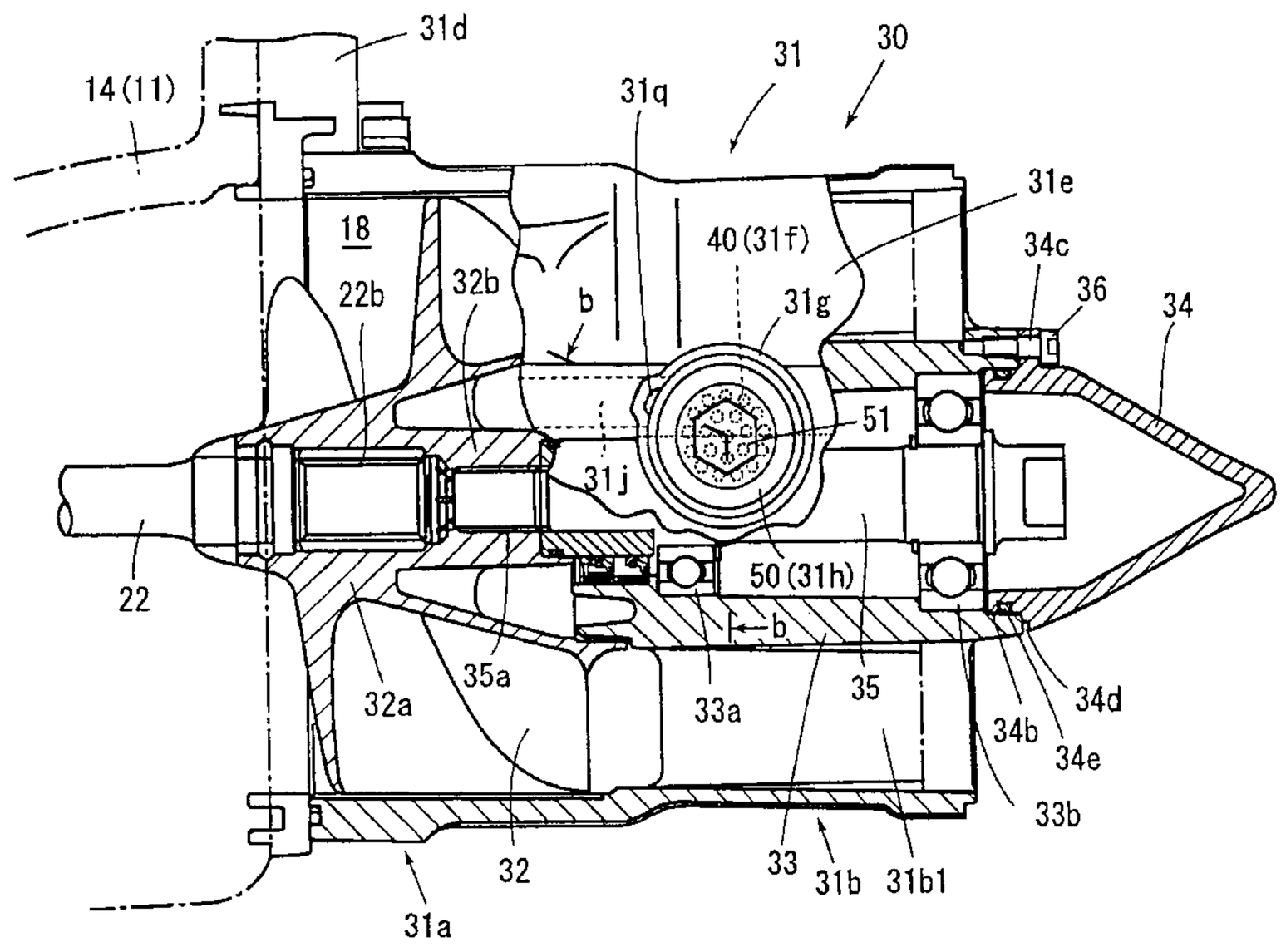
(57) **ABSTRACT**

To simplify a mounting job for a filter and a lid at a water intake port. A filter accommodation chamber of a cylindrical shape forms a water intake port that is provided in a side wall of a stator having therein an impeller rotatably disposed. A filter of a cylindrical shape is placed in the filter accommodation chamber and an opening in the filter accommodation chamber is closed by a lid of a circular shape through either screwing or press-fitting. A flow path is integrally formed with a peripheral wall of the filter accommodation chamber. A bottom portion of the cylindrical filter is formed into an inclined surface. An inclined step portion, which abuts against an edge portion of the inclined surface of filter, is formed in the filter accommodation chamber. In addition, an opening, which communicates with the flow path when the inclined surface edge portion of the cylindrical filter and the inclined step portion abut against each other so that the two are brought into coincidence with each other, is formed in the cylindrical filter. Part of an inner peripheral surface of the filter accommodation chamber and part of an outer peripheral surface of the cylindrical filter may be formed into a flat surface.

21 Claims, 6 Drawing Sheets



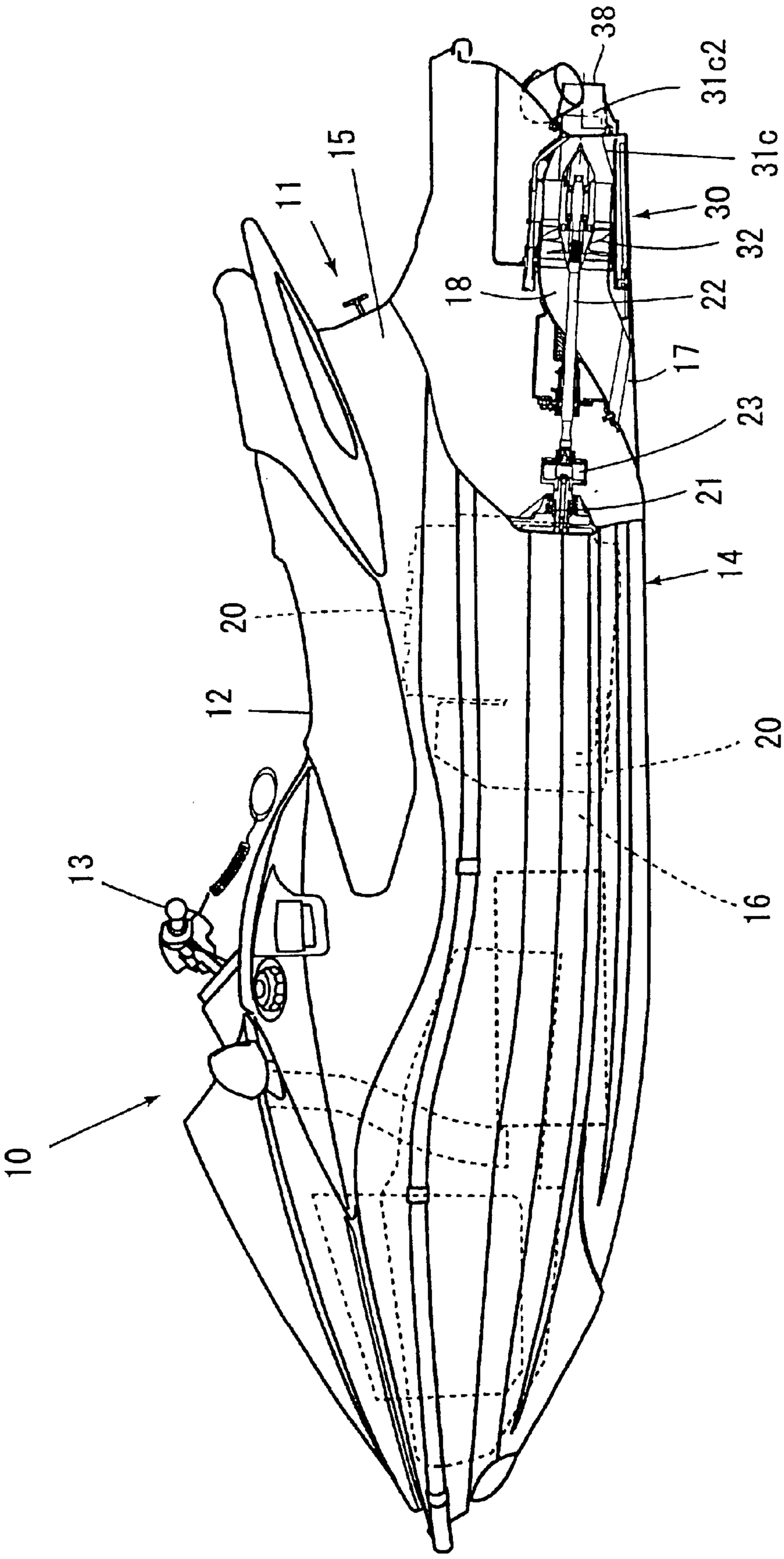


FIG. 1

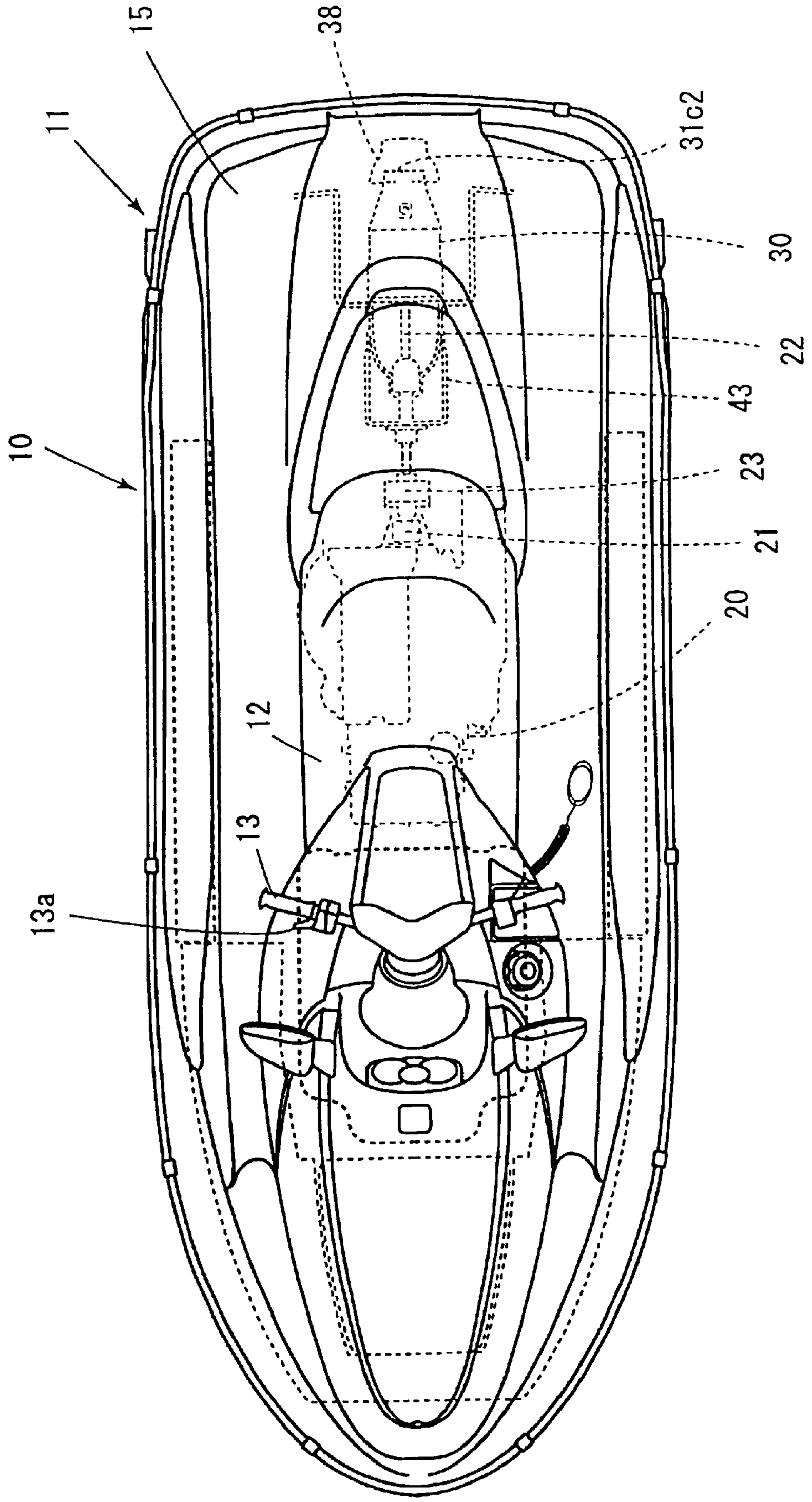
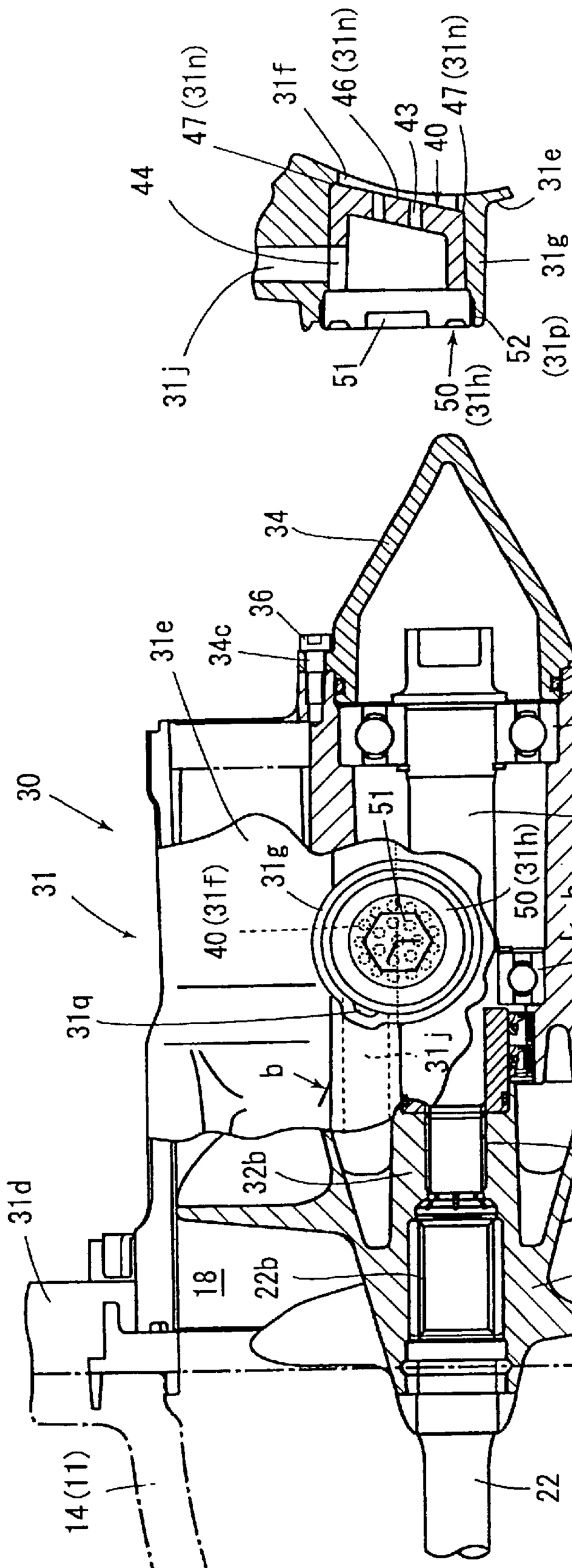


FIG. 2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47(31n)
31f
46(31n)
43
40
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31e
31g
31j
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(31h)
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(31p)
34
36
34c
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34d
34e
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34b
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51
50(31h)
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31b1
31b
33
33a
b
31q
31j
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14(11)
22

FIG. 3(a)

FIG. 3(b)

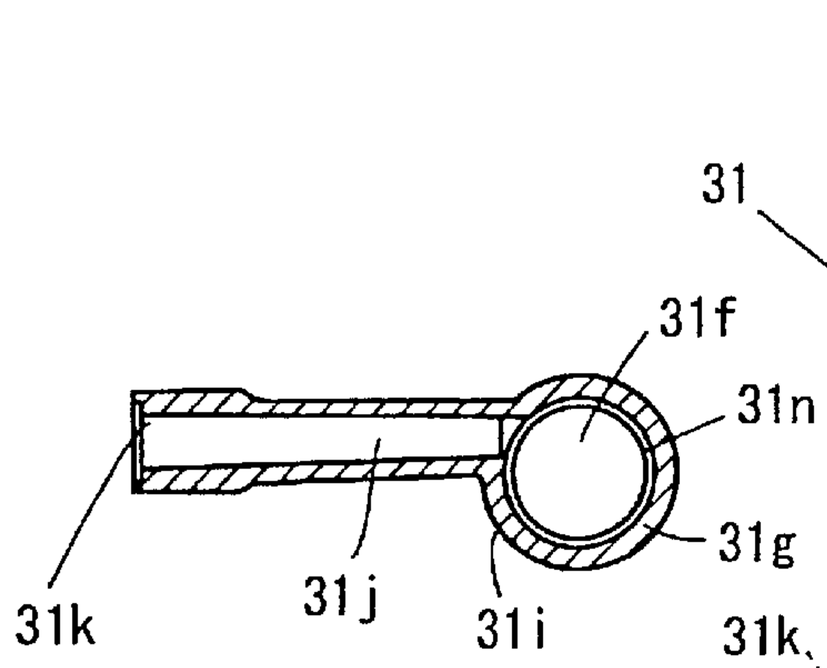


FIG. 4(d)

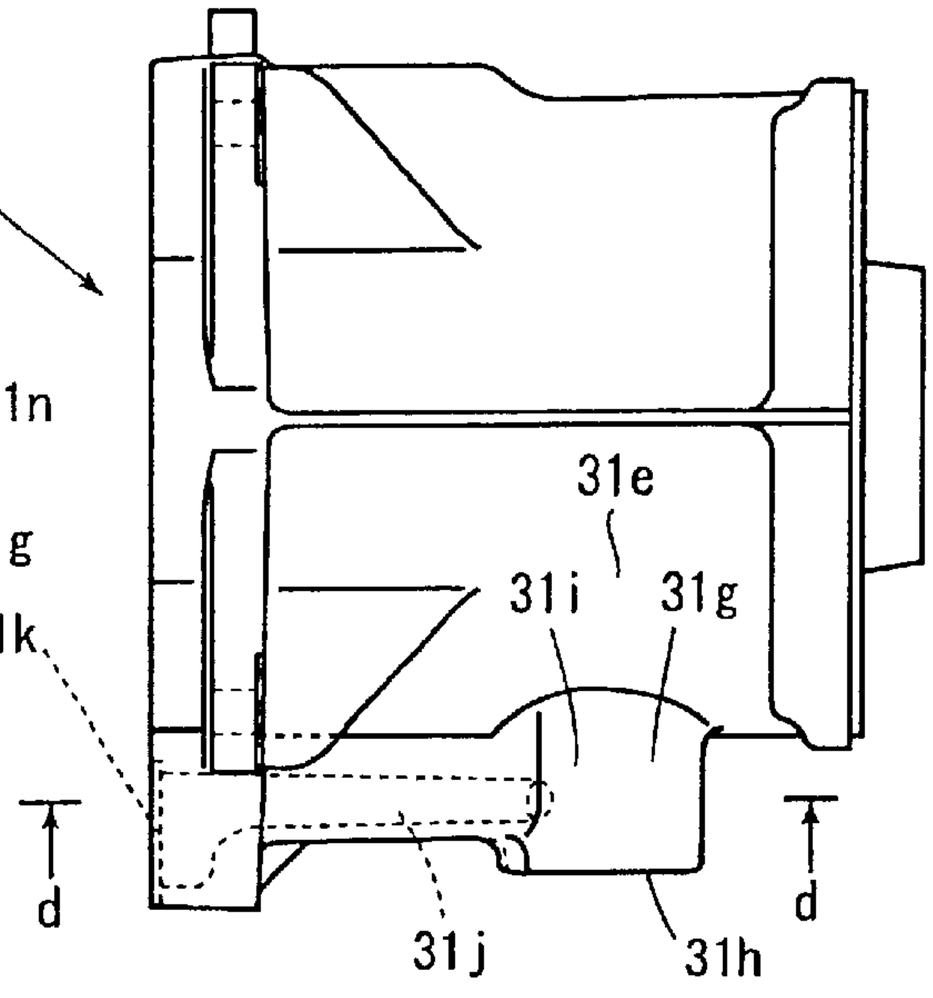


FIG. 4(c)

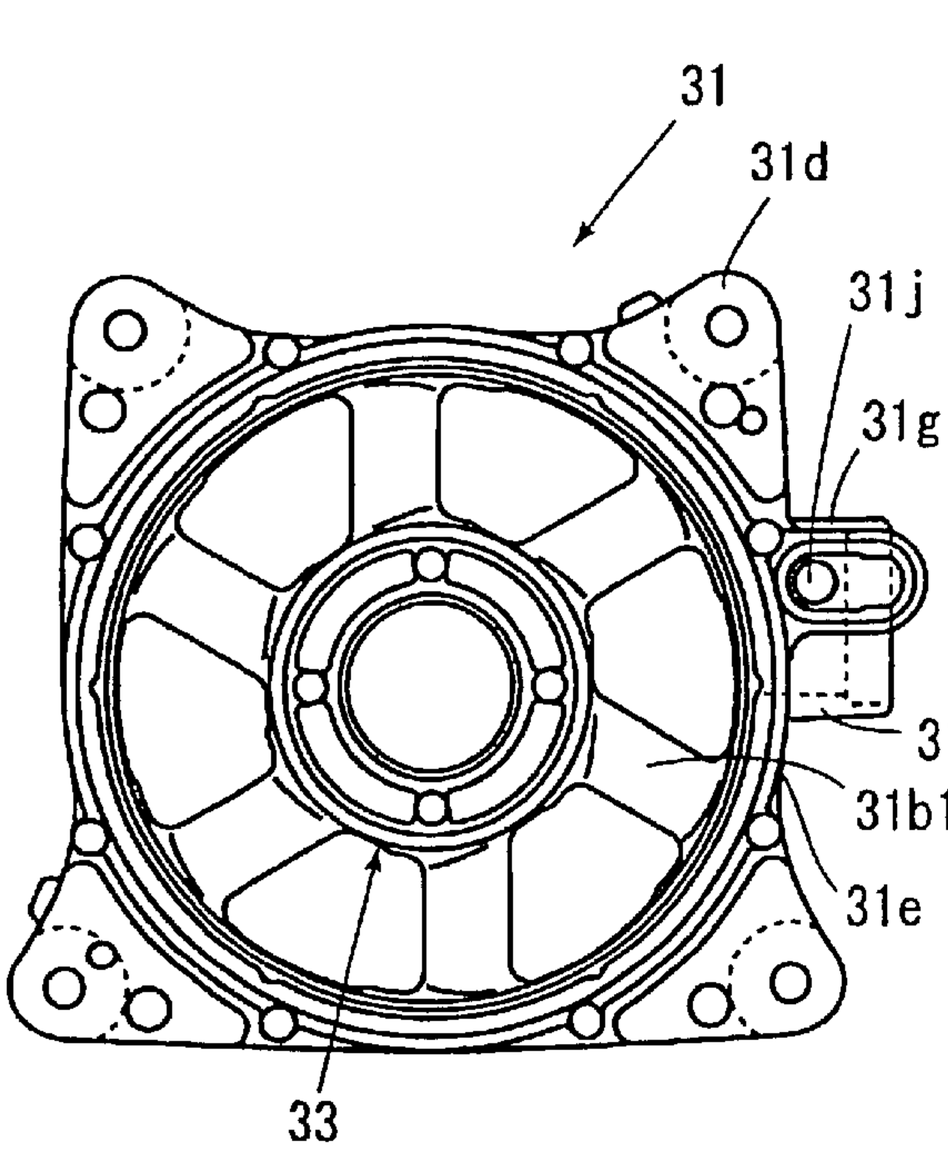


FIG. 4(a)

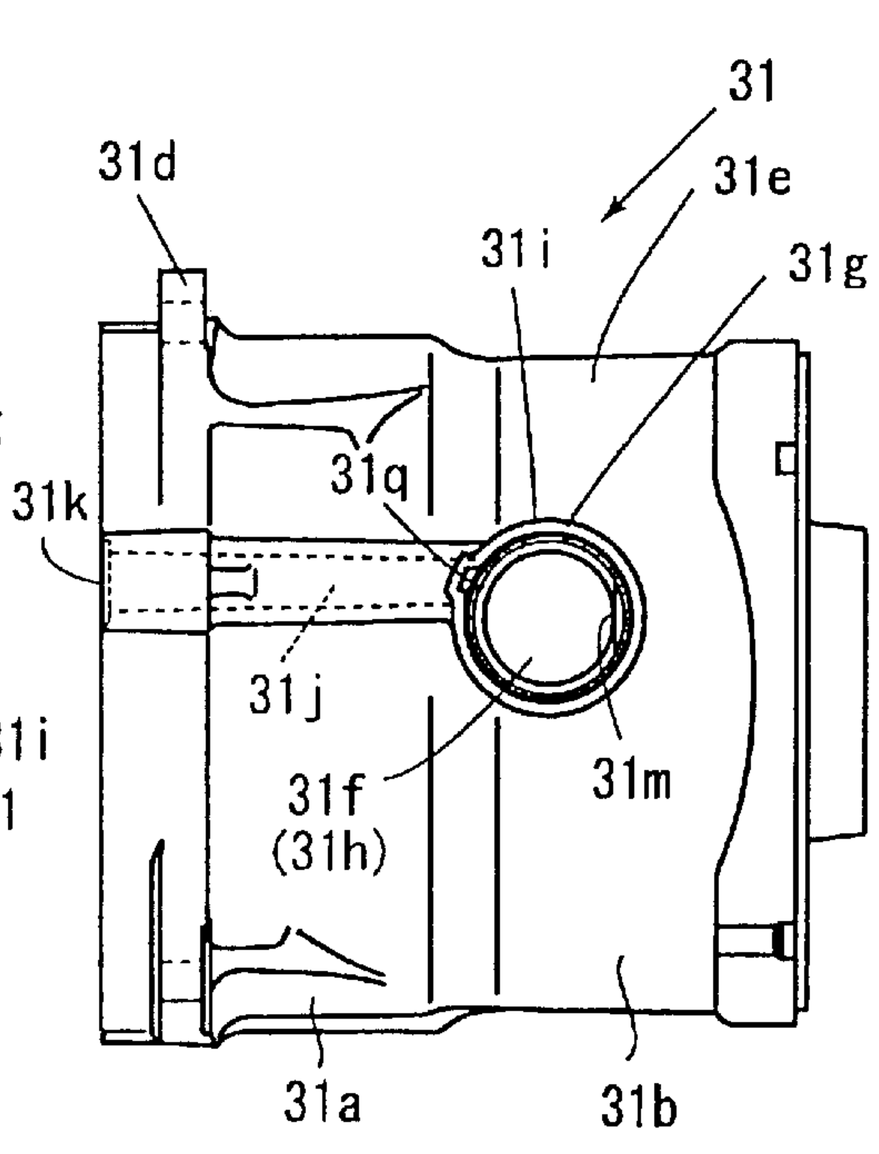


FIG. 4(b)

FIG. 5(b)

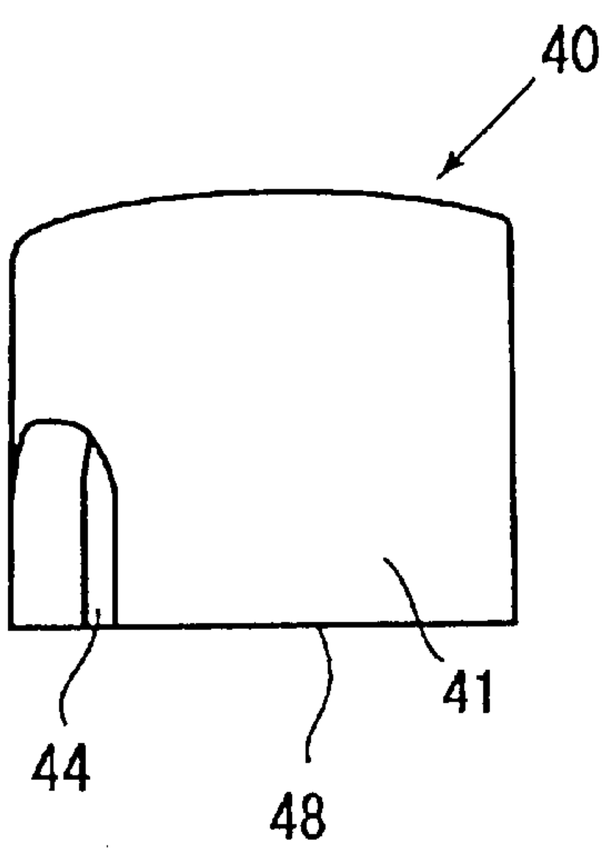
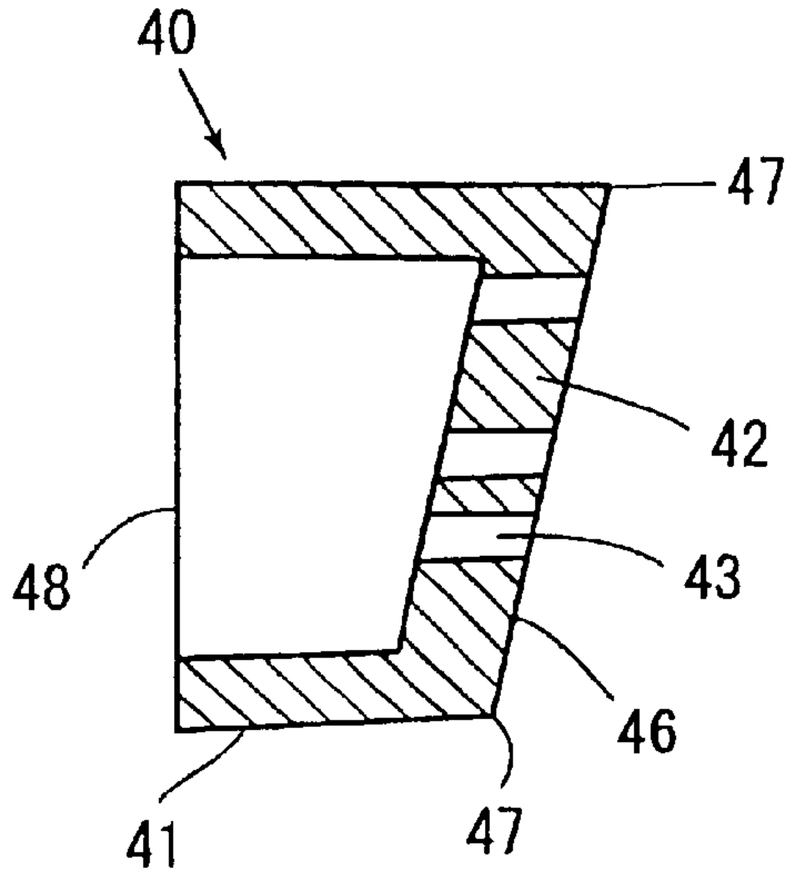


FIG. 5(d)



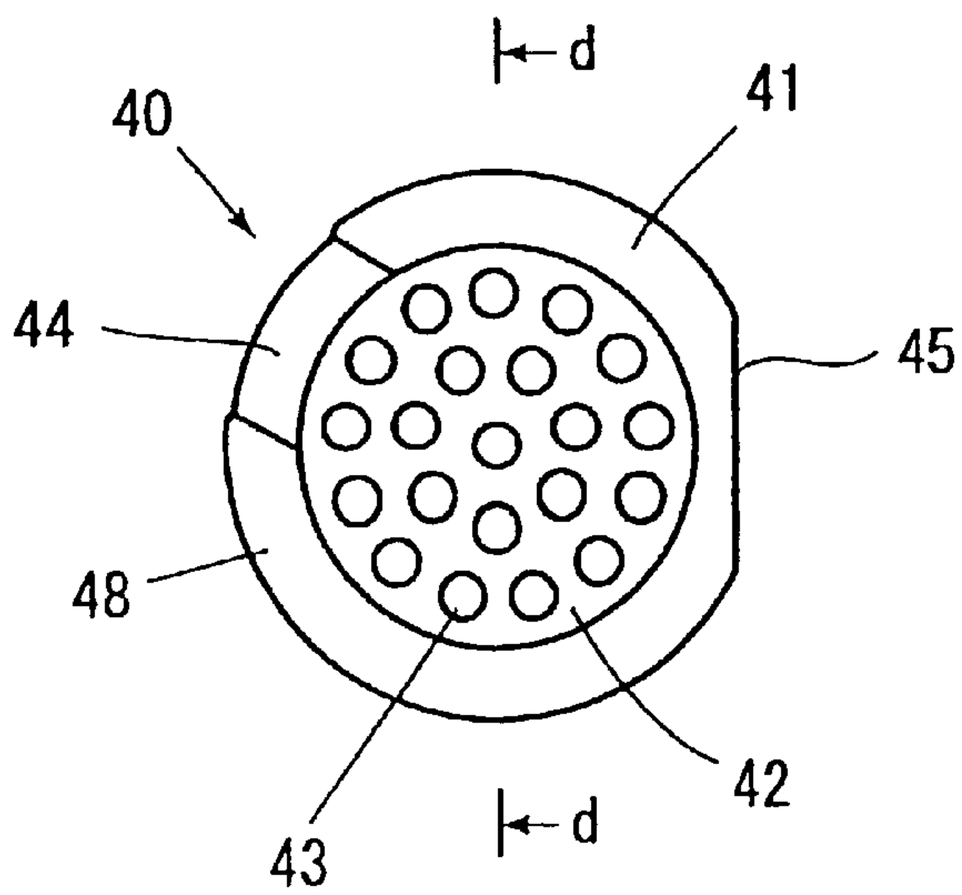


FIG. 5(a)

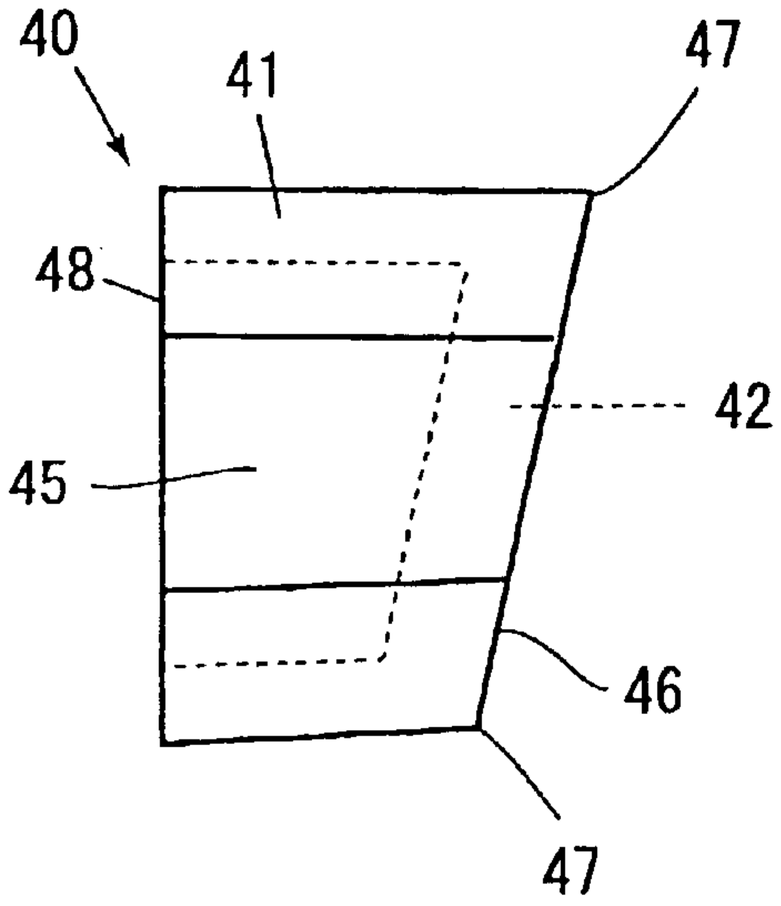


FIG. 5(c)

FIG. 6(a)
PRIOR ART

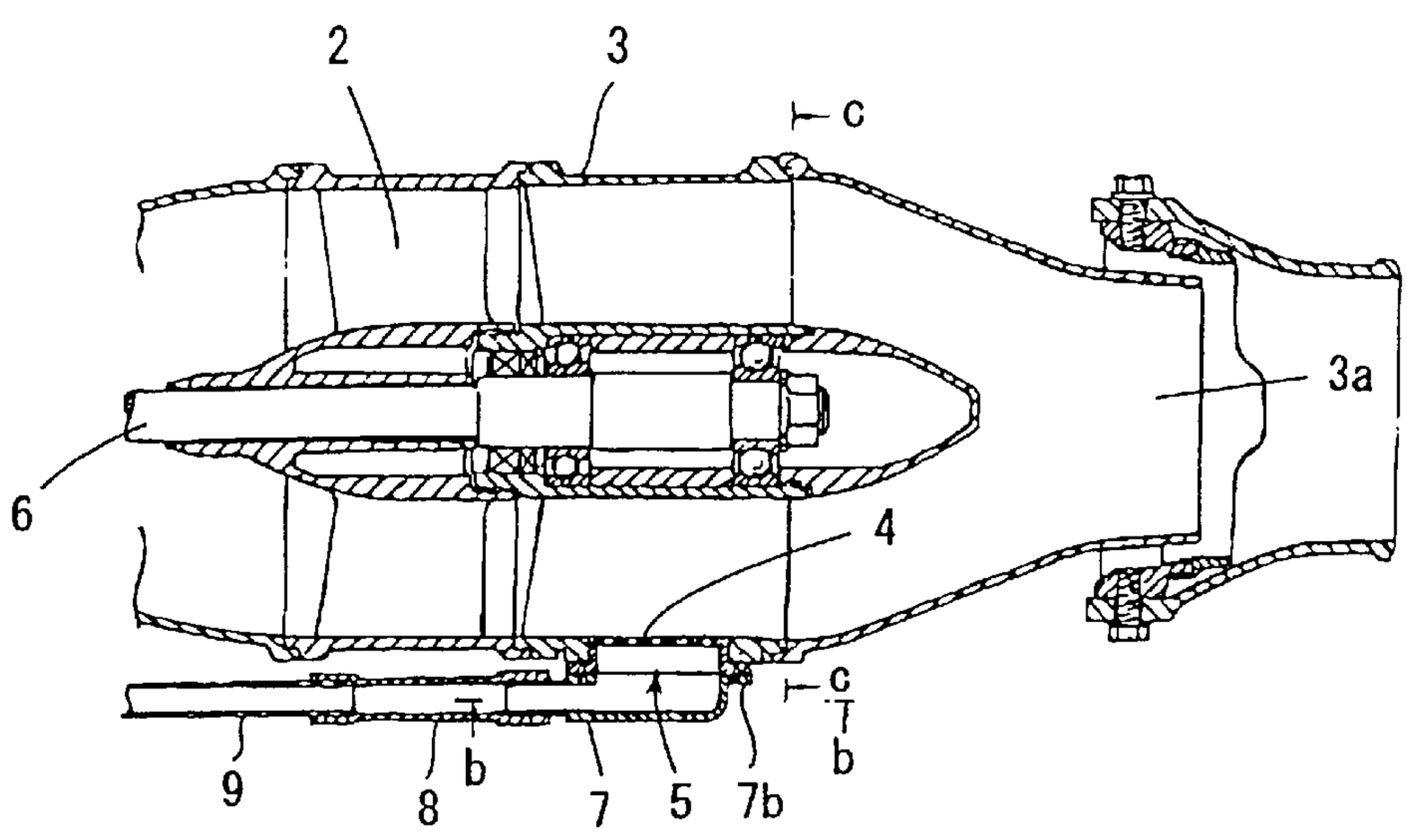


FIG. 6(b)
PRIOR ART

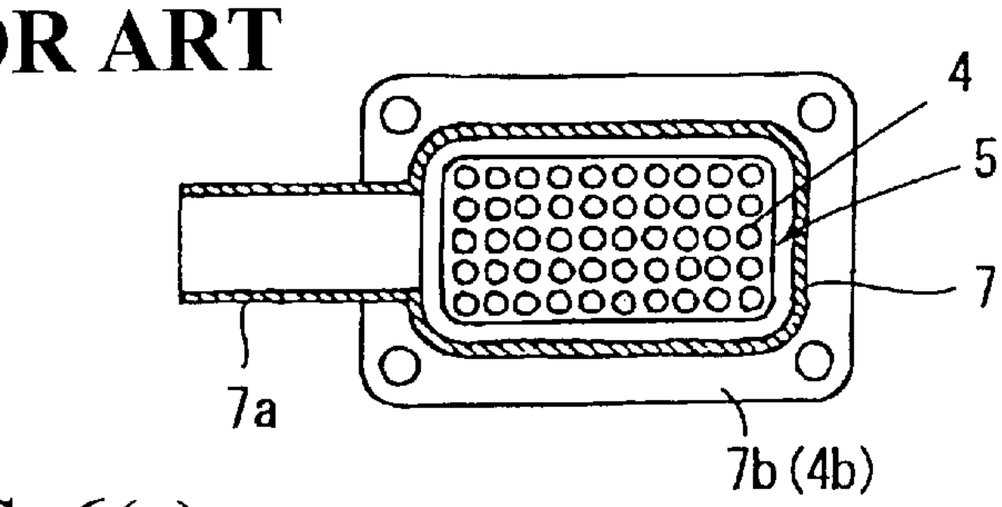
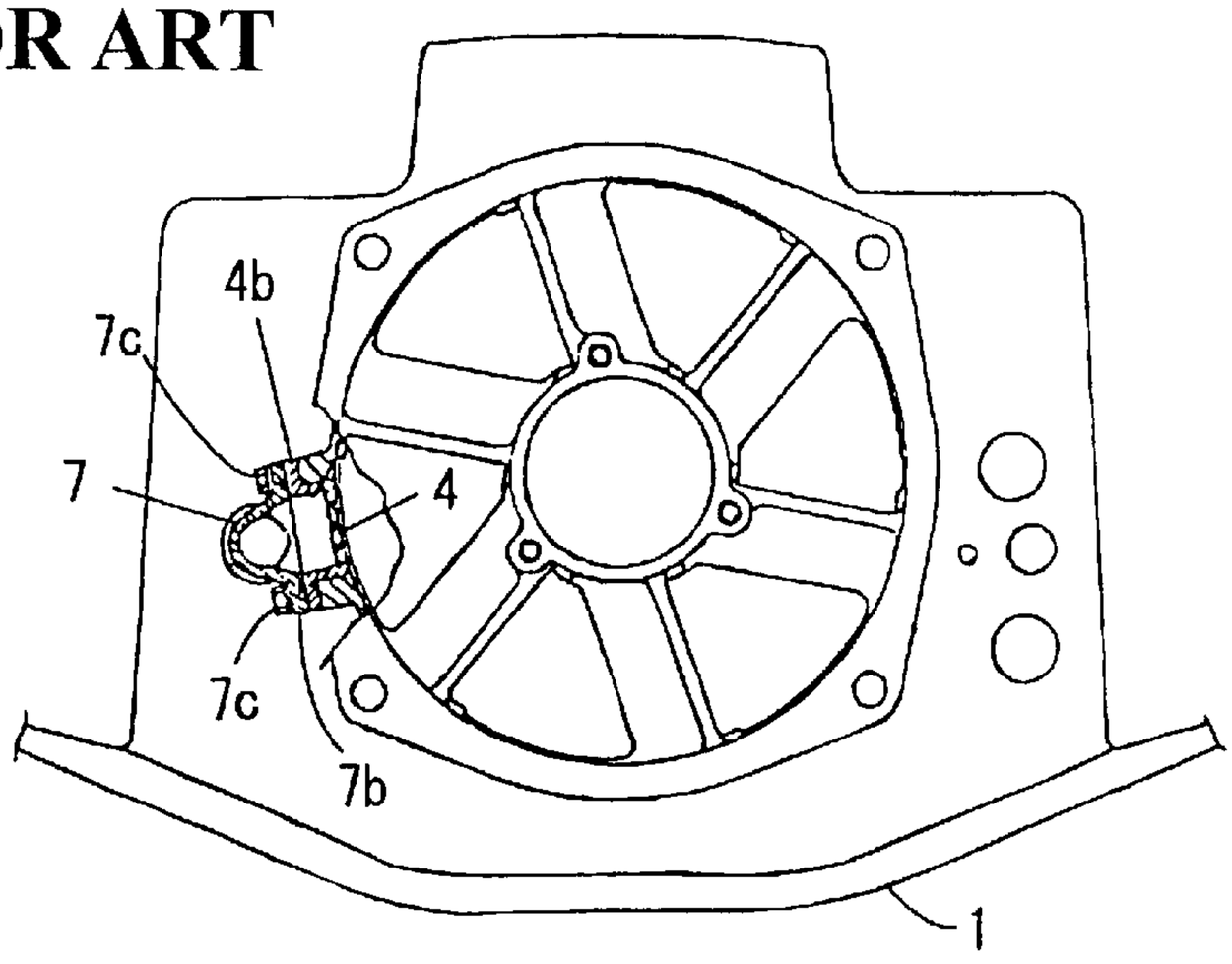


FIG. 6(c)
PRIOR ART



WATER JET PROPELLER

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority under 35 USC 119 to Japanese Patent Application No. 2001-284064 filed on Sep. 18, 2001 the entire contents thereof is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a water jet propeller used in ships and, more particularly, to a structure of a water intake port thereof.

2. Description of Background Art

Japanese Patent Laid-open No. Hei 10-119883 discloses a conventional water jet propeller.

FIGS. **6**(*a*) to **6**(*c*) illustrate the water jet propeller, with FIG. **6**(*a*) being a cross-sectional view, FIG. **6**(*b*) being an enlarged cross-sectional view taken along line b—b in FIG. **6**(*a*), and FIG. **6**(*c*) being a cross-sectional view taken along line c—c in FIG. **6**(*a*).

The water jet propeller is mounted to a rear portion of a ship body **1**. There is provided a water intake port **5** provided with a filter **4** in a side wall of a stator **3**, in which an impeller **2** is rotatably disposed.

The impeller **2** is coupled to a drive shaft **6**, a front portion of which is coupled to an output shaft of an engine not shown. When the impeller **2** is rotatably driven by the engine and spurts of a stream of water are sent through a nozzle **3***a* of the stator **3** to propel the ship body **1**.

As shown in FIG. **6**(*b*), the water intake port **5** is opened in a substantially rectangular shape. A substantially rectangular filter **4** is then mounted in this opening which, in turn, is covered with a lid member **7** which also is of a substantially rectangular shape.

The lid member **7** is provided integrally with a pipe section **7***a* that communicates with the water intake port **5**. A flexible hose **9** is connected by way of a connection pipe **8** to the pipe section **7***a*. An end portion not shown of the flexible hose **9** is, in turn, connected to the engine.

When the impeller **2** is rotatably driven, therefore, part of a water stream on a downstream side thereof is supplied from the water intake port **5** to the engine by way of the filter **4** and further through the pipe section **7***a* of the lid member **7**, the connection pipe **8**, and the flexible hose **9**, thus being used as engine coolant.

Referring to FIGS. **6**(*b*) and **6**(*c*), the filter **4** is provided with a flange **4***b*, while the lid member **7** is also provided with a flange **7***b*. The filter **4** and the lid member **7** are jointly fastened together using four bolts **7***c* with the flanges **4***b*, **7***b* mated to each other. Thus, the filter **4** and the lid member **7** are removably mounted with respect to the side portion of the stator **3**.

According to the conventional water jet propeller described in the foregoing paragraphs, the filter **4** and the lid member **7** of the water intake port **5** are shaped into a substantially rectangle, and they are mounted to the stator **3** by jointly fastening them together using four bolts **7***c* with the flanges **4***b*, **7***b* mated to each other. This makes the mounting job extremely laborious.

SUMMARY AND OBJECTS OF THE INVENTION

It is therefore an object of the present invention to solve this problem and to provide a water jet propeller that allows a filter and a lid to be mounted with ease.

To achieve the foregoing object, according to the present invention, there is provided a water jet propeller wherein a water intake port includes a filter that is provided in a side wall of a stator containing a rotatable impeller, wherein the side wall of the stator is provided with a tubular filter accommodation chamber that forms the water intake port. A tubular filter is housed in the filter accommodation chamber and an opening is formed in a circular shape in the filter accommodation chamber and is closed by a circular lid through tightening screws or press-fitting.

According to the present invention, a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber and a bottom portion of the tubular filter is formed by an inclined surface that is inclined with respect to an axial direction of the tubular filter. In addition, an inclined step portion is formed in the filter accommodation chamber so as to abut against and receive an edge portion of the inclined surface of the tubular filter. An opening, which communicates with the flow path when the inclined surface edge portion abuts against the inclined step portion so that the two portions are brought into coincidence with each other, is formed in the tubular filter.

According to the present invention, a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber. An inner peripheral surface of the filter accommodation chamber and an outer peripheral surface of the tubular filter are partially formed into a flat surface. An opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter.

In the water jet propeller according to the present invention, the water intake port that includes the filter is provided in the side wall of the stator containing the rotatable impeller. The tubular filter accommodation chamber forming the water intake port is provided in the side wall of the stator. The tubular filter is housed in the filter accommodation chamber with the circular opening formed in the filter accommodation chamber. The circular lid is either screwed or press-fitted in position to close the circular opening. According to the water jet propeller having this arrangement, the filter and the lid can be mounted to the side wall of the stator by simply closing the opening in the filter accommodation chamber through either screwing or press-fitting, after the tubular filter has been placed in the tubular filter accommodation chamber.

Namely, in the water jet propeller according to the present invention, it is remarkably easier to mount the filter and the lid than in the conventional arrangement.

According to the water jet propeller of the present invention, the flow path is integrally formed with respect to the peripheral wall of the filter accommodation chamber and the bottom portion of the tubular filter is formed by the inclined surface that is inclined with respect to the axial direction of the tubular filter, the inclined step portion is formed in the filter accommodation chamber so as to abut against and receive the edge portion of the inclined surface of the tubular filter. The opening, which communicates with the flow path when the inclined surface edge portion abuts against the inclined step portion so that the two portions are brought into coincidence with each other, is formed in the tubular filter. All this offers the following function.

Namely, in the conventional water jet propeller described earlier, the flow path from the filter accommodation chamber is formed by the pipe section **7***a* that is integrated with the lid member **7**. Therefore, if the lid member **7** is mounted in

a reverse direction with respect to a fore-and-aft direction, the flow path **7***a* is also mounted in a reverse direction with respect to the fore-and-aft direction. More attention should therefore be paid to the mounting of the lid member **7**, thus making the mounting job even more laborious.

According to the water jet propeller of the present invention, on the other hand, the problems inherent in the conventional technology will not occur, since the flow path is formed integrally with respect to the peripheral wall of the filter accommodation chamber.

In addition, the bottom portion of the tubular filter is formed by the inclined surface that is inclined with respect to the axial direction of the tubular filter, the inclined step portion is formed in the filter accommodation chamber so as to abut against and receive the edge portion of the inclined surface of the tubular filter. In view of the opening, which communicates with the flow path when the inclined surface edge portion abuts against the inclined step portion so that the two portions are brought into coincidence with each other, formed in the tubular filter, the flow path in the filter accommodation chamber and the opening in the filter are automatically brought into communication with each other when the tubular filter is inserted in the filter accommodation chamber and the edge portion of the inclined surface of the tubular filter abuts against (or fit into) the inclined step portion of the filter accommodation chamber.

This helps make the mounting job of the filter and the lid even easier.

According to the water jet propeller of the present invention, the flow path is integrally formed with respect to the peripheral wall of the filter accommodation chamber. The inner peripheral surface of the filter accommodation chamber and the outer peripheral surface of the tubular filter are partially formed into the flat surface and the opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter. This offers the following additional function.

Namely, as described earlier, in the conventional water jet propeller, the flow path from the filter accommodation chamber is formed by the pipe section **7***a* that is integrated with the lid member **7** and, therefore, if the lid member **7** is mounted in a reverse direction with respect to the fore-and-aft direction, the flow path **7***a* is also mounted in a reverse direction with respect to the fore-and-aft direction. More attention should therefore be paid to the mounting of the lid member **7**, thus making the mounting job even more laborious.

According to the present invention, on the other hand, the problems inherent in the conventional technology will not occur, since the flow path is formed integrally with respect to the peripheral wall of the filter accommodation chamber.

Since the inner peripheral surface of the filter accommodation chamber and the outer peripheral surface of the tubular filter are partially formed into the flat surface, and the opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter, the flow path in the filter accommodation chamber and the opening in the filter are automatically brought into communication with each other when the tubular filter is inserted in the filter accommodation chamber so that both of the above-mentioned flat surface portions coincide with each other.

Therefore, the job of mounting the filter and the lid becomes even easier.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. **1** is a partly cutaway schematic side elevational view showing a typical small planing boat employing one embodiment of a water jet propeller according to the present invention;

FIG. **2** is a schematic plan view showing the same;

FIGS. **3**(*a*)–**3**(*b*) illustrate the jet pump **30**, FIG. **3**(*a*) being a fragmentary side sectional view and FIG. **3**(*b*) being a cross-sectional view taken along line b—b in FIG. **3**(*a*);

FIGS. **4**(*a*)–**4**(*d*) illustrate a stator **31** of the jet pump **30**, FIG. **4**(*a*) being a front elevational view (looking the ship body from the front), FIG. **4**(*b*) being a side elevational view, FIG. **4**(*c*) being a plan view of FIG. **4**(*b*), and FIG. **4**(*d*) being a cross-sectional view taken along line d—d in FIG. **4**(*c*);

FIGS. **5**(*a*)–**5**(*d*) illustrate a filter, FIG. **5**(*a*) being a side elevational view (as viewed from the side of the ship body from a side), FIG. **5**(*b*) being a plan view of FIG. **5**(*a*), FIG. **5**(*c*) being a side elevational view of FIG. **5**(*a*), and FIG. **5**(*d*) being a cross-sectional view taken along d—d in FIG. **5**(*a*); and

FIGS. **6**(*a*), **6**(*b*) and **6**(*c*) are explanatory drawings of the conventional technology.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The embodiments of the present invention will be described with reference to the accompanying drawings.

FIG. **1** is a partly cutaway schematic side elevational view showing a typical small planing boat employing one embodiment of a water jet propeller according to the present invention. FIG. **2** is a schematic plan view showing the same.

As shown in FIGS. **1** and **2**, a small planing boat **10** is a riding type small watercraft, in which a passenger sits on a seat **12** on a ship body **11** and grips a handlebar **13** provided with a throttle lever to steer the boat.

The ship body **11** is of a floating body structure that forms a space **16** internally between a hull **14** and a deck **15** joined to each other. An engine **20** is installed on the hull **14** inside the space **16**. In addition, a water jet propeller (hereinafter referred to also as a jet pump) **30** is provided as a propulsion means driven by the engine **20** that is installed in a rear portion of the hull **14**.

The jet pump **30** is provided with an impeller **32** disposed inside a flow path **18** that extends from a water inlet port **17** opened in a bottom of the boat to a jet port **31***c***2** opened in a trailing edge of the ship body. A deflector **38** is provided adjacent to the jet port **31***c***2**. A shaft (drive shaft) **22** for

driving the impeller **32** is coupled to an output shaft **21** of the engine **20** by way of a coupler **23**. When the impeller **32** is rotatably driven by the engine **20** through the coupler **23** and the shaft **22** spurts of water taken in through the water inlet port **17** are sent from the jet port **31***c***2** through the deflector **38**, thus propelling the ship body **11**. A driving speed of the engine **20**, or a propulsion force provided by the jet pump **30**, is controlled by circularly moving a throttle lever **13***a* (see FIG. **2**) of the handlebar **13** either forward or backward. The deflector **38** is connected to the handlebar **13** through a control cable not shown. It is operated as the handlebar **13** is turned either forward or backward as necessary to change a direction of travel of the ship body **11**.

Referring to FIGS. **3**(*a*) and **3**(*b*), the jet pump **30** is provided with a stator (duct) **31** that forms the flow path **18** communicating with the water inlet port **17** (see FIG. **1**) provided in the bottom portion of the ship body **11**, with the impeller **32** disposed inside the stator **31**. A bearing portion **33** of the impeller is provided inside the stator **31**. A cap **34** plugs up a trailing edge of the bearing portion **33**.

The jet pump **30** is mounted removably to the hull **14** when a flange portion **31***d* (see FIGS. **4**(*a*)–**4**(*d*)) formed at a front portion of the stator **31** is secured to the hull **14** using bolts not shown.

The stator **31** is provided with an impeller accommodation portion **31***a*, inside which the impeller **32** is disposed, a bearing accommodation portion **31***b*, and a nozzle portion **31***c* (see FIG. **1**). The impeller accommodation portion **31***a* and the bearing accommodation portion **31***b* are formed integrally with each other. The bearing portion **33** is formed integrally within the bearing accommodation portion **31***b* through a stator blade **31***b* **1**.

A front portion of a boss portion **32***a* of the impeller **32** is engaged with splines **22***b* formed on a rear end of the drive shaft **22** and the impeller **32** turns with the drive shaft **22**. As noted earlier, the leading edge of the drive shaft **22** is coupled to the output shaft **21** of the engine **20** mounted in the ship body **11** through the coupler **23** (FIG. **1**).

An impeller shaft **35**, which supports a rear portion **32***b* of the boss portion **32***a* of the impeller **32**, is rotatably supported on the bearing portion **33** through ball bearings **33***a*, **33***b*. External threads **35***a* are formed on a leading edge of the impeller shaft **35**. The external threads **35***a* engage internal threads formed on the rear portion **32***b* of the boss portion of the impeller **32**, which provides a connection between the impeller **32** and the impeller shaft **35**.

In summary, the front portion of the boss portion **32***a* of the impeller **32** is coupled to the shaft **22**, while the rear portion **32***b* of the boss portion is coupled to the impeller shaft **35**, which allows the impeller **32** to turn with the shaft **22** and the impeller shaft **35**.

There are formed, at a front portion of the cap **34**, an insertion portion (a cylindrical portion) **34***b* to be inserted into a rear portion of the bearing portion **33** and three (only one is shown) insertion holes **34***c* for a screw **36** (see FIG. **3**(*a*)). A groove, into which an O-ring **34***e* is mounted, is formed at the cylindrical insertion portion **34***b*.

The cap **34** is therefore mounted to the rear portion of the bearing portion **33** as follows. Namely, the insertion portion **34***b* is inserted (press-fitted) into the rear portion of the bearing portion **33** with the O-ring **34***e* mounted to the insertion portion **34***b* as shown in FIG. **3**(*a*) and the screw **36** is finally tightened.

A partial cutout **34***d* is formed on an abutting surface between the cap **34** and the bearing portion **33**. During maintenance service procedures, the cap **34** can be easily removed by inserting a tip of a tool (for example, a screwdriver) into this cutout **34***d* with the screw **36** removed.

Referring to FIGS. **3** and **4**, a filter accommodation chamber **31***g* of a tubular shape (a cylindrical shape according to the embodiment) is formed integrally on a side wall **31***e* of the stator **31**, serving to form a water intake port **31***f* in a portion downstream of the impeller **32**. A filter **40** of a tubular shape (a cylindrical shape according to the embodiment) is housed in the filter accommodation chamber **31***g* as shown in FIG. **3**(*b*). An opening **31***h* in the filter accommodation chamber **31***g* is closed by a circular lid **50** that is screwed into position. The opening **31***h* may instead be closed by press-fitting the lid **50**.

Referring to FIGS. **4**(*a*)–**4**(*d*), a flow path **31***j*, through which water from the water intake port **31***f* flows in, is integrally formed in a peripheral wall **31***i* of the filter accommodation chamber **31***g*. A coolant hose is connected to an end portion **31***k* of the flow path **31***j* by way of a joint pipe not shown, through which coolant is supplied to the engine **20**.

Referring to FIGS. **5**(*a*)–**5**(*d*), the filter **40** is provided with a cylindrical portion **41** and a bottom portion **42** formed integrally therewith. A number of holes **43** are made in the bottom portion **42**. The diameter of each of the holes **43** should be about 3 mm.

In addition, there is formed an opening **44** of a U-shaped cutout in the cylindrical portion **41**.

Referring to FIG. **4**(*b*), part of an inner peripheral surface of the filter accommodation chamber **31***g* is formed into a flat surface (the flat surface portion is indicated by a reference numeral **31***m*). Referring further to FIGS. **5**(*a*) and **5**(*c*), part of an outer peripheral surface of the tubular filter **40** is also shaped into a flat surface (the flat surface portion is indicated by a reference numeral **45**).

When the filter **40** is inserted into the filter accommodation chamber **31***g*, therefore, unless these flat surface portions **31***m* and **45** are properly aligned with each other, the filter **40** cannot be inserted. When the filter **40** is inserted into the filter accommodation chamber **31***g* with the flat surface portions **31***m* and **45** aligned, the opening **44** in the filter **40** opposes the flow path **31***j* in the filter accommodation chamber **31***g* brings the two into communication with each other [see FIG. **3**(*b*)].

Furthermore, according to the embodiment, the bottom portion **42** of the tubular filter **40** is formed by an inclined surface **46** that is inclined with respect to an axial direction [a right-and-left direction in FIGS. **5**(*c*) and **5**(*d*)] of the tubular filter **40**, as shown in FIGS. **5**(*a*)–**5**(*d*). As shown further in FIG. **3**(*b*) and FIG. **4**(*d*), an inclined step portion **31***n*, which abuts against and receives an edge portion **47** of the inclined surface **46** of the tubular filter **40**, is formed in the filter accommodation chamber **31***g*.

When the filter **40** is inserted into the filter accommodation chamber **31***g*, therefore, the inclined surface **46** at the bottom portion **42** of the filter must be brought into coincidence with the inclined step portion **31***n* of the filter accommodation chamber **31***g*, otherwise, a head portion **48** of the filter **40** protrudes from the filter accommodation chamber **31***g*, thus preventing the filter **40** from being completely housed in the filter accommodation chamber **31***g*, which hampers the lid **50** from being mounted in position. If the inclined surface **46** of the filter bottom portion **42** is brought into coincidence with the inclined step portion **31***n* of the filter accommodation chamber **31***g* as the filter is inserted into the filter accommodation chamber **31***g*, the opening **44** in the filter **40** opposes the flow path **31***j* in the filter

accommodation chamber **31***g*, bringing the two into communication with each other [see FIG. **3**(*b*)].

According to this embodiment, the following two arrangements are employed; namely:

an arrangement, in which partial flat surface portions **31***m* and **45** are formed on the inner peripheral surface of the filter accommodation chamber **31***g* and the outer peripheral surface of the filter **40**; and,

ii. an arrangement, in which the bottom portion **42** of the tubular filter **40** is made into the inclined surface **46** and the inclined step portion **31***n* is formed in the filter accommodation chamber **31***g*.

It is nonetheless possible to employ either one of these two arrangements i and ii.

Referring to FIGS. **3**(*a*)–**3**(*b*), a hexagon recessed portion **51** is formed in the lid **50** at a head portion thereof and, in addition, external threads **52** are formed on an outer periphery thereof. Internal threads **31***p* are formed, on the other hand, on an inner peripheral surface on an upper portion of the filter accommodation chamber **31***g*.

The opening **31***h* in the filter accommodation chamber **31***g* can be easily plugged with the lid **50** by a manner that when, after the filter **40** has been housed in the filter accommodation chamber **31***g* as described above, the two types of threads **52**, **31***p* are brought into threaded engagement with each other by a tool engaged in the hexagon recessed portion **51** in the lid.

According to the embodiment, referring to FIG. **3**(*a*) and FIG. **4**(*b*), there is provided a partial recessed portion **31***q* on an inner peripheral surface in the opening **31***h* of the filter accommodation chamber **31***g*. After the lid **50** has been mounted in the opening **31***h* of the filter accommodation chamber **31***g*, a tool is inserted into the recessed portion **31***q* for collapsing the threads **52** in the lid **50**, thereby preventing the lid **50** from thereafter turning and thus preventing the lid **50** from coming off the filter accommodation chamber **31***g*.

According to the water jet propeller having arrangements as described above, the following operational effects can be achieved.

The tubular filter accommodation chamber **31***g* that forms the water intake port **31***f* is provided on the side wall **31***e* of the stator **31**, inside which the impeller **32** is rotatably disposed. The tubular filter **40** is housed in the filter accommodation chamber **31***g*. The opening **31***h* is formed circularly in the filter accommodation chamber **31***g* and is closed by the circular lid **50** through screwing or press-fitting. Thanks to this arrangement, the filter **40** and the lid **50** can be mounted to the side wall **31***e* of the stator **31** by placing the tubular filter **40** in the tubular filter accommodation chamber **31***g* and closing the opening **31***h* in the filter accommodation chamber **31***g* with the circular lid **50** through screwing or press-fitting.

Namely, according to this water jet propeller, the mounting job of the filter **40** and the lid **50** is made remarkably simpler as compared with the conventional type.

(b) The flow path **31***j* is integrally formed with respect to the peripheral wall of the filter accommodation chamber **31***g*. The bottom portion of the tubular filter **40** is formed by the inclined surface **46** that is inclined with respect to the axial direction of the tubular filter. The inclined step portion **31***n*, which abuts against and receives the edge portion **47** of the inclined surface **46** of the tubular filter **40**, is formed in the filter accommodation chamber **31***g*. In addition, the opening **44**, formed in the tubular filter **40**, communicates with the flow path **31***j* when the inclined surface edge portion **47** and the inclined step portion **31***n* abut against each other so as to bring the two into coincidence with each other. These arrangements offer the following additional operational effects.

Namely, in the conventional water jet propeller described earlier, the flow path from the filter accommodation chamber is formed by the pipe section **7***a* formed integrally with the lid member **7**. As a result, if the lid member **7** is mounted in a reverse direction with respect to a fore-and-aft direction, the flow path **7***a* is also mounted in a reverse direction with respect to the fore-and-aft direction. More attention should therefore be paid to the mounting of the lid member **7**, thus making the mounting job even more laborious.

According to the water jet propeller according to the embodiment of the present invention, on the other hand, such a problem inherent in the conventional technology will not occur, since the flow path **31***j* is formed integrally with respect to the peripheral wall of the filter accommodation chamber **31***g*.

Furthermore, the bottom portion of the tubular filter **40** is formed by the inclined surface **46** that is inclined with respect to the axial direction of the tubular filter. The inclined step portion **31***n*, which abuts against and receives the edge portion **47** of the inclined surface **46** of the tubular filter **40**, is formed in the filter accommodation chamber **31***g*. In addition, the opening **44**, formed in the tubular filter **40**, communicates with the flow path **31***j* when the inclined surface edge portion **47** and the inclined step portion **31***n* abut against each other so as to bring the two into coincidence with each other. The flow path **31***j* in the filter accommodation chamber **31***g* and the opening **44** in the filter **40** are automatically brought into communication with each other. Therefore, when the tubular filter **40** is inserted in the filter accommodation chamber **31***g* the edge portion **47** of the inclined surface **46** of the tubular filter **40** abuts against (or fit into) the inclined step portion **31***n* of the filter accommodation chamber **31***g*.

This helps make the mounting job of the filter **40** and the lid **50** even easier.

(c) Part of the inner peripheral surface of the filter accommodation chamber **31***g* and part of the outer peripheral surface of the tubular filter **40** are formed into a flat surface (**31***m*, **45**). In addition, there is formed in the tubular filter **40** the opening **44** that communicates with the flow path **31***j* when the flat surface portion **45** of the tubular filter **40** and the flat surface portion **31***m* of the filter accommodation chamber **31***g* are brought into coincidence with each other. When the tubular filter **40** is inserted into the filter accommodation chamber **31***g* so as to bring the two flat surface portions **31***m* and **45** into coincidence with each other, it automatically causes the flow path **31***j* in the filter accommodation chamber **31***g* to communicate with the opening **44** in the filter **40**.

The mounting job for the filter **40** and the lid **50** will therefore become even easier.

While the invention has been described with reference to preferred embodiments thereof, it is to be understood that the invention is not limited to the preferred embodiments or structures. Rather, the invention is intended to cover various modifications within the spirit and scope of the invention.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. A water jet propeller including a water intake port having a filter being disposed therein and being provided in a side wall of a stator containing a rotatable impeller comprising:

a tubular filter accommodation chamber being formed in the side wall of the stator, said tubular filter accommodation chamber forming the water intake port;

a tubular filter being positioned within the filter accommodation chamber; and

an opening formed in a circular shape in the filter accommodation chamber and being closed by a circular lid with screw threads.

2. The water jet propeller according to claim **1**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, a bottom portion of the tubular filter is formed by an inclined surface that is inclined with respect to an axial direction of the tubular filter, an inclined step portion is formed in the filter accommodation chamber so as to abut against and receive an edge portion of the inclined surface of the tubular filter, and an opening, which communicates with the flow path when the inclined surface edge portion abut against the inclined step portion so that the two portions are brought into coincidence with each other, is formed in the tubular filter.

3. The water jet propeller according to claim **1**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, an inner peripheral surface of the filter accommodation chamber and an outer peripheral surface of the tubular filter are partially formed into a flat surface, and an opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter.

4. The water jet propeller according to claim **2**, wherein said tubular filter is cylindrical in shape and includes the inclined surface formed integrally therewith, said inclined surface forming a bottom of said tubular filter.

5. The water jet propeller according to claim **4**, wherein said inclined surface includes a plurality of apertures in communication with water being disposed within said stator.

6. The water jet propeller according to claim **3**, wherein the opening in said tubular filter extends from one end that is brought into communication with a flow path when said tubular filter is inserted into said filter accommodation chamber with said flat surface being aligned relative to each other.

7. The water jet propeller according to claim **6**, wherein the flat surface on said tubular filter is offset by a predetermined angle relative to said opening in said tubular filter.

8. A water jet propeller including a water intake port having a filter being disposed therein and being provided in a side wall of a stator containing a rotatable impeller comprising:

a tubular filter accommodation chamber being formed in the side wall of the stator, said tubular filter accommodation chamber forming the water intake port;

a tubular filter being positioned within the filter accommodation chamber; and

an opening formed in a circular shape in the filter accommodation chamber and being closed by a circular lid by press-fitting.

9. The water jet propeller according to claim **8**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, a bottom portion of the tubular filter is formed by an inclined surface that is inclined with respect to an axial direction of the tubular filter, an inclined step portion is formed in the filter accommodation chamber so as to abut against and receive an edge portion of the inclined surface of the tubular filter, and an opening, which communicates with the flow path when the inclined surface edge portion abut against the inclined step portion so that the two portions are brought into coincidence with each other, is formed in the tubular filter.

10. The water jet propeller according to claim **8**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, an inner peripheral surface of the filter accommodation chamber and an outer peripheral surface of the tubular filter are partially formed into a flat surface, and an opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter.

11. The water jet propeller according to claim **9**, wherein said tubular filter is cylindrical in shape and includes the inclined surface formed integrally therewith, said inclined surface forming a bottom of said tubular filter.

12. The water jet propeller according to claim **11**, wherein said inclined surface includes a plurality of apertures in communication with water being disposed within said stator.

13. The water jet propeller according to claim **10**, wherein the opening in said tubular filter extends from one end that is brought into communication with a flow path when said tubular filter is inserted into said filter accommodation chamber with said flat surface being aligned relative to each other.

14. The water jet propeller according to claim **13**, wherein the flat surface on said tubular filter is offset by a predetermined angle relative to said opening in said tubular filter.

15. A cooling water flow path adapted for use in cooling an engine comprising:

a water intake port having a filter being disposed therein and being provided in a side wall of a stator containing a rotatable impeller:

a tubular filter accommodation chamber being formed in the side wall of the stator, said tubular filter accommodation chamber forming the water intake port;

a tubular filter being positioned within the filter accommodation chamber; and

an opening formed in a circular shape in the filter accommodation chamber and being closed by a circular lid;

wherein water supplied from said water intake port and through said tubular filter is adapted for being supplied to an engine for cooling the engine.

16. The cooling water flow path adapted for use in cooling an engine according to claim **15**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, a bottom portion of the tubular filter is formed by an inclined surface that is inclined with respect to an axial direction of the tubular filter, an inclined step portion is formed in the filter accommodation chamber so as to abut against and receive an edge portion of the inclined surface of the tubular filter, and an opening, which communicates with the flow path when the inclined surface edge portion abut against the inclined step portion so that the two portions are brought into coincidence with each other, is formed in the tubular filter.

17. The cooling water flow path adapted for use in cooling an engine according to claim **15**, wherein a flow path is integrally formed with respect to a peripheral wall of the filter accommodation chamber, an inner peripheral surface of the filter accommodation chamber and an outer peripheral surface of the tubular filter are partially formed into a flat surface, and an opening, which communicates with the flow path when the flat surface portion of the tubular filter coincides with the flat surface portion of the filter accommodation chamber, is formed in the tubular filter.

18. The cooling water flow path adapted for use in cooling an engine according to claim **16**, wherein said tubular filter is cylindrical in shape and includes the inclined surface formed integrally therewith, said inclined surface forming a bottom of said tubular filter.

19. The cooling water flow path adapted for use in cooling an engine according to claim **18**, wherein said inclined surface includes a plurality of apertures in communication with water being disposed within said stator.

20. The cooling water flow path adapted for use in cooling an engine according to claim **17**, wherein the opening in said tubular filter extends from one end that is brought into communication with a flow path when said tubular filter is inserted into said filter accommodation chamber with said flat surface being aligned relative to each other.

21. The cooling water flow path adapted for use in cooling an engine to claim **20**, wherein the flat surface on said tubular filter is offset by a predetermined angle relative to said opening in said tubular filter.

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